MINIATURE AIR COMPRESSOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an air compressor, and more particularly to a miniature air compressor for art designing and has a small volume.

2. Description of Related Art

A miniature air compressor usually used in art designing for providing compressed air to an air gun for equally spraying paint. However, almost all the conventional miniature compressor has a complicated structure and has a piston that may not be smoothly operated and provides an unstable compressed air current.

The present invention has arisen to mitigate and/or obviate the disadvantages of the miniature air compressor for art designing.

SUMMARY OF THE INVENTION

The main objective of the present invention is to provide an improved air compressor for art designing. The miniature air compressor of the present invention can provide a stable air current.

To achieve the objective, the miniature air compressor in accordance with the present invention comprises a casing and a motor mounted in the casing. A cylinder is secured on a top portion of the casing. The motor is provided to drive a crank that includes a free end having a piston mounted thereon. The piston is reciprocally movably received in the cylinder for compressing air. A partition is longitudinally mounted to the cylinder for

airtightly closing the cylinder. A check valve is longitudinally mounted to the partition and extends to communicate with the cylinder to prevent the compressed air from flowing back into the cylinder when the piston is downward moved. A top cover is airtightly mounted to the partition and has a cavity defined to receive the check valve. The compressed air is decompressed in the cavity.

Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a miniature air compressor in accordance with the present invention;

Fig. 2 is a partially exploded perspective view of the miniature air compressor in Fig. 1;

Fig. 3 is a partially exploded perspective view of the miniature air compressor in Fig. 1;

Fig. 4 is a partially cross-sectional view of the miniature air compressor along line 4-4 in Fig. 2;

Fig. 5 is a partially cross-sectional view of the miniature air compressor along line 5-5 in Fig. 2;

Fig. 6 is an operational side plan view in partial section of the miniature air compressor in Fig. 1 when the piston is downward moved;

Fig. 7 is a cross-sectional view on the miniature air compressor of the present invention in Fig. 6 along line 7-7;

Fig. 8 is an operational side plan view in partial section of the miniature air compressor in Fig. 1 when the piston is upwardly moved; and

Fig. 9 is a cross-sectional view on the miniature air compressor of the present invention in Fig. 8 along line 9-9.

DETAILED DESCRIPTION OF THE INVENTION

With reference to the drawings and initially to Figs. 1-6, a miniature air compressor for art designing in accordance with the present invention comprises a casing (10), a cylinder (20) mounted on a top portion of the casing (10), a partition (30) mounted to the casing (10) for airtightly closing the cylinder (20) and a top cover (40) is airtightly mounted to the partition (30) for containing the compressed air.

A motor (11) is secured in the casing (10) for driving a connector (12) to rotate. The connector (12) is securely mounted to a shaft (not numbered) of the motor (10). The casing (10) has a skirt (14) upwardly extending therefrom and the cylinder (20) is mounted within skirt (14). A crank (15) is connected to one end of connector (12) and reciprocally driven by the connector (12). A piston (16) is centrally securely mounted to a free end of the crank (15) and reciprocally moved in the cylinder (20). The piston (16) has a hole (17) defined therein and longitudinally extending through the piston (16). In the preferred embodiment of the present invention, the hole (17) is a sunken hole and has a first diameter smaller than that of a second diameter. The first diameter is formed and corresponds to a bottom of the piston (16), and the second diameter is formed and corresponds to the top of the piston (16). The piston has a first spring (27) received in the hole (17) and extending to the top of the piston (16).

A first O-ring (18) is mounted on a periphery of the piston (16) and airtightly abutting an inner periphery of the cylinder (20). A valve (26) has first end secured to the top of the piston (16) and a second end abutting the first spring (27) for selectively closing the hole (17) when the piston (16) is upwardly moved in the cylinder (20). The first spring (27) quickly pulls the second end of the valve (26) to open the hole (17) when the piston (16) is downward moved. A washer (25) is secured on the first end of the valve (26) to prevent the second end of the valve (26) from overly upwardly pulled. The casing (10) further comprises a cover (19) for longitudinally closing the casing (10).

The partition (30) is securely mounted to the skirt (14) of the casing (10). A ring of protrusion (31) downward extends from the partition (30). The ring of protrusion (31) has an inner diameter slightly greater than that of an outer diameter of the cylinder (20) such that the cylinder (20) is longitudinally mounted to the partition (30) within the ring of protrusion (31) and forms a chamber (21) in the cylinder (20), thereby the piston (16) is reciprocally in the chamber (21). A second O-ring (32) is mounted between the partition (30) and the cylinder (20) to form an airtight condition between the partition (30) and the cylinder (20).

A check valve (33) is longitudinally mounted to the partition (30) and extending through the partition (30) to communicate with the cylinder (20). The check valve (33) has multiple through holes (36) laterally defined in an outer periphery of the check valve (33) near the partition (30) and extending to communicate with an inner periphery of the check valve (33). A slider (35) is reciprocally movably received in the check valve (33) for selectively closing

the multiple through holes (36) when the piston (16) is downward moved to prevent the compressed air in the top cover (40) from flowing back to the cylinder (20). A second spring (34) is compressively mounted between the slider (35) and a bottom of the check valve (33) to provide a restitution force to the slider (35) when the slider (35) is upwardly moved to open the multiple through hole (36) in the check valve (33) and quickly close the multiple through holes (36) when the piston (16) is downward moved.

The top cover (40) has a cavity (41) defined therein and communicating with the multiple through holes (36) in the check valve (33). A third O-ring (42) is mounted between the top cover (40) and the partition (30) to form an airtight condition between the top cover (40) and the partition (30). A joint (47) is laterally mounted to the top cover (40) and communicating with the cavity (41) in the top cover (40). The joint (47) is adapted to be connected to a spray gun for spraying paint.

With reference to Figs. 6 and 7, the second end of the valve (26) is upwardly pulled, the compressed air flows into the cylinder (20) and the slider (35) is downward moved to close the multiple through holes (36) to prevent the compress air in the cavity (41) from flowing back to the cylinder (20) due to the restitution force of the spring (34) in the check valve (33) when the piston (16) is downward moved due to the crank (15). With reference to Figs. 8 and 9, the second end of the valve (26) restitutes to abut the spring (27) in the piston (16) and closing the sunken hole (17) when the piston is upwardly moved to compressed air in the cylinder (20). The compressed air upwardly pushes the slider (35) to make the multiple through holes (36) communicate with the

cylinder (20) such that the compressed air flows into the cavity (41) in the top cover (40). Consequently, the pressure of the compressed air is reduced when the compressed air passes through the multiple through hole (36) in the check valve (33) because the volume of the cavity (41) is greatly greater than that of the multiple through holes (36) in the check valve (33). As described above, the structure of the air compressor in accordance with the present invention is simplified and provides a stable compressed air current because the compressed air is previously decompressed in the cavity (41) in the top cover (40).

Although the invention has been explained in relation to its preferred embodiment, it is to be understood that many other possible modifications and variations can be made without departing from the spirit and scope of the invention as hereinafter claimed.